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208 235-5600 Business

March 2, 2021

Arthur Burbank
USDA Forest Service
4350 South Cliffs Dr.
Pocatello, ID 83204

Subject: Biological Selenium Removal Treatment Technology
Water Treatment Pilot Study
January 2021 Progress Report

Dear Art,

This progress report summarizes key activities in January 2021 associated with Phase 2 of the Water Treatment Pilot Study located near Hoopes Spring. This Pilot Study is being conducted as part of the Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS) to provide information on the effectiveness of the active biological treatment system in removing selenium and other COPCs from South Fork Sage Creek Springs and Hoopes Spring.

Work related to the approved Phase 2 Pilot Study continues at the site in accordance with the Final *Phase 2 Pilot Study Work Plan and Sampling and Analysis Plan, Ultra-Filtration/Reverse Osmosis and Biological Selenium Removal Fluidized Bed Bioreactor Treatment Technology* (Phase 2 WP/SAP).

Identification of Deliverables and Data Transmittals

There were no outstanding deliverables or transmittals for the month of January. At the time of this report, we have received laboratory data for Week 151. Preliminary laboratory data are presented in Table 1. The field data for the Week 151 sampling events is summarized in Table 2.

Completed Activities

The following activities associated with the Phase 2 Pilot Study were completed in January 2021:

- Continued system operation and treatment of selenium.
- The system was shut down on January 18th due to failure of the post treatment clarifier. An inspection found that the upper seal of the clarifier had failed, causing the system to short circuit which was the same failure as February 2019.

The Treatment System Pilot (TSP) influent total selenium concentration for Week 151 was 168 ug/L. The Treatment System Pilot effluent total selenium concentration for Week 151 was 15.4 ug/L. The average removal efficiency for January prior to shutdown was approximately 91% for total selenium removal.

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The average flow of the TSP for the month of January prior to shutdown was 1,538 gpm. Since full scale operations began in early December 2017 approximately 2.6 billion gallons of impacted water has been treated. The mass of selenium removed from December 2017 through January 2021 is approximately 2,736 pounds.

Upcoming Activities

The following activities associated with the Phase 2 Pilot Study are planned through February 2021:

- Repairs on the post treatment clarifier were completed February 23 including the system modifications and the system is being reseeded. Once the biology of the clarifier is replenished the system will be restarted.
- Additional plant maintenance has been scheduled and completed during this down time in order to reduce future down time.
- Reinstate the system monitoring in accordance with the sampling and analysis plan when the system has been restarted and stabilized.

Please contact me if there are questions regarding this monthly progress report.

Sincerely,

Jeffrey Hamilton
Environmental Engineer

cc:

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Table 1
Laboratory Results Full Analyte List

Hoopes Springs Water Treatment Plant Pilot Study
Phase 2, Performance Monitoring

		Week 151		
	Station >>	Influent	Ultra Filtration Backwash	Effluent
	Sample ID >>	SC0121-LSSHS-IN001	SC0121-LSSHS-UFB001	SC0121-LSSHS-EF001
	Date >>	1/6/2021		
Analyte	**Units**			
General Chemistry				
Alkalinity, Total as CaCO3	mg/L	150	100	170
Bicarbonate, as CaCO3	mg/L	150	100	170
Ammonia, as N	mg/L	0.026 U	0.026 U	0.026 U
Biochemical Oxygen Demand	mg/L	2 U	2 U	2 U
Carbonate, as CaCO3	mg/L	1 U	1 U	1 U
Hardness, as CaCO3	mg/L	261	50.3	242
Chemical Oxygen Demand	mg/L	5 U	5 U	5 U
TDS	mg/L	372	10 U	256
TOC	mg/L	0.5 U	0.5 U	0.924 J
TSS	mg/L	2 U	2 U	2 U
Cations and Anions				
Chloride	mg/L	12.9	2.17	19.4
Fluoride	mg/L	0.318	0.0696 J	0.302
Calcium, Dissolved	mg/L	64.8	12.5	57.2
Magnesium, Dissolved	mg/L	24.2	4.62	24
Potassium, Dissolved	mg/L	0.762	0.235 J	0.848
Sodium, Dissolved	mg/L	7.82	2.15	8.17
Metals and Metalloids				
Aluminum, Dissolved	mg/L	0.0076 U	0.0113 J	0.0079 J
Aluminum, Total	mg/L	0.0148 J	0.0419 J	0.0077 J
Antimony, Dissolved	mg/L	0.0000732 U	0.0000732 U	0.0000732 U
Antimony, Total	mg/L	0.000306 J	0.000108 J	0.000141 J
Arsenic, Dissolved	mg/L	0.000398 U	0.000398 U	0.000398 U
Arsenic, Total	mg/L	0.000446 J	0.000398 U	0.000398 U
Barium, Dissolved	mg/L	0.0492	0.00957	0.0238
Barium, Total	mg/L	0.048	0.0102	0.024
Beryllium, Dissolved	mg/L	0.000047 U	0.000047 U	0.000047 U
Beryllium, Total	mg/L	0.000047 U	0.000047 U	0.000047 U
Boron, Dissolved	mg/L	0.000238 U	0.000238 U	0.000238 U
Boron, Total	mg/L	0.00728 J	0.00384 J	0.00829 J
Cadmium, Dissolved	mg/L	0.0000362 U	0.0000362 U	0.0000362 U
Cadmium, Total	mg/L	0.0000515 J	0.0000362 U	0.0000362 U
Chromium, Dissolved	mg/L	0.00054 J	0.000119 J	0.0000433 U
Chromium, Total	mg/L	0.00133 J	0.00116 J	0.000889 J
Cobalt, Dissolved	mg/L	0.000103 J	0.0000358 J	0.00241
Cobalt, Total	mg/L	0.000107 J	0.0000561 J	0.00243
Copper, Dissolved	mg/L	0.0000418 U	0.0000418 U	0.0000418 U
Copper, Total	mg/L	0.00103	0.0014	0.00142
Iron, Dissolved	mg/L	0.002 J	0.0049 J	0.0015 U
Iron, Total	mg/L	0.0416 J	0.053 J	0.0511 J
Lead, Dissolved	mg/L	0.0000554 U	0.0000554 U	0.0000554 U
Lead, Total	mg/L	0.0000554 U	0.0000554 U	0.0000554 U
Manganese, Dissolved	mg/L	0.000381 J	0.000163 J	0.00736
Manganese, Total	mg/L	0.000571 J	0.00212	0.00879
Mercury, Dissolved	mg/L	0.000081 J	0.000032 J	0.00003 J
Mercury, Total	mg/L	0.00004 J	0.000034 J	0.000031 J
Molybdenum, Dissolved	mg/L	0.00203	0.00037 J	0.00892
Molybdenum, Total	mg/L	0.00199	0.000403 J	0.00863
Nickel, Dissolved	mg/L	0.0000948 J	0.0000533 U	0.00418
Nickel, Total	mg/L	0.000548 J	0.000341 J	0.00468
Selenium, +4 (selenite)	mg/L	0.00015 U	0.00015 U	0.0113
Selenium, +6 (selenate)	mg/L	0.171	0.0321	0.00321
Selenium, Dissolved	mg/L	0.173	0.0302	0.0151
Selenium, Total	mg/L	0.168	0.03	0.0154

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Hoopes Springs Water Treatment Plant Pilot Study
Phase 2, Performance Monitoring

		Week 151		
	Station >>	Influent	Ultra Filtration Backwash	Effluent
	Sample ID >>	SC0121-LSSHS-IN001	SC0121-LSSHS-UFB001	SC0121-LSSHS-EF001
	Date >>	1/6/2021		
Analyte	**Units**			
Silver, Dissolved	mg/L	0.0000172 U	0.0000172 U	0.0000172 U
Silver, Total	mg/L	0.0000238 J	0.0000172 U	0.0000172 U
Thallium, Dissolved	mg/L	0.0000657 U	0.0000657 U	0.0000657 U
Thallium, Total	mg/L	0.0000657 U	0.0000657 U	0.0000657 U
Uranium, Dissolved	mg/L	0.00151	0.000209 J	0.00145
Uranium, Total	mg/L	0.00182	0.000271 J	0.00158
Vanadium, Dissolved	mg/L	0.00122 J	0.000342 J	0.00014 U
Vanadium, Total	mg/L	0.00224	0.00154	0.000877 J
Zinc, Dissolved	mg/L	0.00282 J	0.00092 J	0.00015 J
Zinc, Total	mg/L	0.00488 J	0.00115 J	0.000434 J
Nutrients				
Nitrate + Nitrite, as N	mg/L	0.313	0.12	0.629
Nitrate, as N	mg/L	0.31	0.12	0.63
Phosphorus, Total	mg/L	0.0857	0.0747	0.0635
Sulfate	mg/L	62.1	12.4	65.7
Sulfide	mg/L	1 U	1 U	1 U

Notes:

Results presented are preliminary, and have not been validated at the time of this report.

U - Analyte not detected above the method detection limit (MDL).

J - Result is estimated.

Table 2
Field Water Quality Data

Hoopes Springs Water Treatment Plant Pilot Study
Phase 2, Performance Monitoring

		Parameter >>	Dissolved Oxygen	ORP	pH	SC	Temperature	Turbidity
		Units >>	mg/L	mV	SU	umhos/cm	C	NTU
Station	**Sample ID**	**Date**						
Week 151								
Influent	SC0121-LSSHS-IN001	1/6/2021	7.06	163	7.17	331	13.02	1
Ultra Filtration Backwash	SC0121-LSSHS-UFB001	1/6/2021	8.16	130	7.78	88	13.15	2.5
Effluent	SC0121-LSSHS-EF001	1/6/2021	8.89	164	7.01	347	12.99	1

Notes: